

HAILSTORM OF MARCH 3, 1920, AT BROKEN ARROW, OKLA.

By JAMES W. ARNOLD.

(Weather Bureau, Broken Arrow, Okla., Mar. 12, 1920.)

On the afternoon of March 3, 1920, a thunderstorm, attended by considerable fall of hail, occurred at this station. The observer studied the size, shape, and composition of the hailstones during the first fall of hail and found many interesting things. The size varied, the average being about one-half inch. The peculiar thing noticed was the shape and composition. About eight-tenths of the hail that fell had a perfect conical shape. They were composed, for the most part of white ice, but most of them had planes, parallel to the base of the cone, of clear ice. These planes were probably one-eighth inch thick and their edges were clear cut and distinctly outlined. These planes of clear ice had no fixed position in the cone nor were there any certain number found in each stone. Some had no planes (these were few), others one, and others two and three. None were found with more than three planes. I remember one particular hailstone that had a one-eighth inch base of clear ice while the rest of the cone was of white ice. These conical-shaped stones were hard.

The other two-tenths were round and in some cases elliptical. And one or two were found which tended to have a conical shape. These round stones were soft and easily crushed with the fingers. Those that hit any hard object would be shattered. Upon examining these they appeared to have a crazy quilt design. When they were crushed in the hand, they broke into elongated shafts or needles of ice, from one-fourth to three-fourths inch long. One of these stones that I crushed broke through in the middle and I could see the conical shape but much distorted.

I was unable to observe the second fall of hail but from what I could see they evidently were much smaller on the average than the first hail. These were soft, as they went to pieces on hitting the roofs of buildings.

The weather in the morning and early afternoon was mild and humid, with a strong south wind (15.8 m/s at 4 p. m.), and the sky partly cloudy. The noon cloud observation was 0.8 Cu. from S., and that at 3 p. m., 0.5

Cu. from south, 0.1 A. Cu. from west, and few Ci. Cu. from west. The morning kite flight showed at 1,000 meters altitude a south wind of 26.6 m/s, temperature 9.2° C., relative humidity 82. At 3 p. m. winds up to 1,000 meters were a little west of south, and lighter. The surface conditions at noon were, temperature 18.9° C., dew point 12.4° C., and at 3 p. m., temperature 22.2° C., dew point 13.0° C.

The thunderstorm developed rapidly in the southwest and the first thunder was heard at 3:37 p. m., about two minutes after it had started to rain at the station. The thunderstorm, I should judge, was about 10 or 12 miles away, which would put it over the Arkansas River. The first rain came from Cu. Nb., which broke away from the center of the storm and passed rapidly over the vicinity of the station. This rain continued intermittently until 4:03 p. m., when the first hail fell. The hail fell in showers, a hard shower of hail being followed by a let-up for about a minute. The first hail ended at 4:10 p. m. along with the rain. Rain began again at 4:30 p. m. and rain and hail at 4:37 p. m., ending at 4:48 p. m.

TORNADO IN SOUTHWESTERN MISSOURI, MARCH 11, 1920.

By THE ASSOCIATED PRESS.

[Report from Branson, Mo.]

A tornado yesterday (Mar. 11) in southwest Missouri killed at least 13 persons, injured a number of others, and did property damage as yet unestimated. Every creek and river of the Ozark Hills region to-day was reported either overflowing or running bank full from the torrential rains that preceded and followed the tornado. * * *

Observers agreed to-day that one tornado instead of two swept the affected districts. Apparently it struck first at Nevada, Mo., where three persons were killed and property damaged \$100,000 or more. Lifting, it swept above four counties before it descended and spent its strength in a rush through Taney County and the Turkey Creek Valley, with a toll of 10 additional lives.¹

¹ For discussion of general weather conditions, see pp. 173-174.